THE SOUTHERN OAK BUSH-CRICKET, *MECONEMA MERIDIONALE* COSTA (ORTHOPTERA: TETTIGONIIDAE) NEW TO BRITAIN

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Abstract. The southern oak bush-cricket, *Meconema meridionale* Costa, not previously known in Britain, was discovered at three separate localities in southern England in the autumn of 2001. At least one and probably two of the sites have an established colony. One male specimen was kept in captivity for eight weeks, feeding on dead insects, and its drumming and mating behaviour observed.

INTRODUCTION

Meconema meridionale is a species from the Mediterranean region of southern Europe whose range has been extending northwards over the last 40 years. It is a pale green bush-cricket resembling our common species, the oak bush-cricket *Meconema thalassinum* (Degeer), but has only tiny scales in place of wings (Fig. 3). There are further small structural differences. For instance, the ovipositor of female *meridionale* is shorter (7.5 mm) than in the common species (9 mm) (Fig. 2), but, conversely, the cerci ('tails') of the male are longer (4 mm instead of 3 mm) (Fig. 1).

My first encounter with this insect was on a field trip through southern France organised by the Orthopterists' Society, an international body for all those who specialise in grasshoppers and crickets. It followed the triennial conference of the Society held in Montpellier in late August, 2001.

In the centre of the historic small town of Espalion, on the River Lot, a green bush-cricket was seen on the ground of a roadside parking-bay beneath a silver maple, *Acer saccharinum* L. On picking it up, I was delighted to find that it was not the expected *Meconema thalassinum* but a female *M. meridionale*. My joy at this discovery was observed with great amusement by two girls sitting at a pavement café, so our leader, Michel Lecoq, went over to explain. "Vous avez assistez à un moment historique", he said, and for me personally it was indeed a historic moment they had witnessed. The resulting conversation was too rapid for me to follow, but it later transpired that the girls, like sentimental young people the world over, had requested that we did not kill the insect. Fortunately, this agreed with my intention, which was to retain the creature in captivity in order to observe its behaviour. All went well with this plan until a week after my return, when its life came to an unfortunate end. When the lid of its box was lifted in order to insert fresh leaves, it escaped and disappeared, being found 20 seconds later in a bowl of hot, soapy water awaiting the weekly wash. No amount of poking, drying or other form of artificial resuscitation could restore it to life. The premature death of this small creature cast a cloud over my life, but this particular cloud had an extremely silver lining, for within a week the dead French female was replaced in its box by a male of British origin.

THE DISCOVERY

On 15.ix.2001 I returned to the railway station at Thames Ditton, Surrey, after a long day spent searching for insects. Since no train was due, further recording was possible and, with the last stroke of the day, I beat a green bush-cricket from a birch

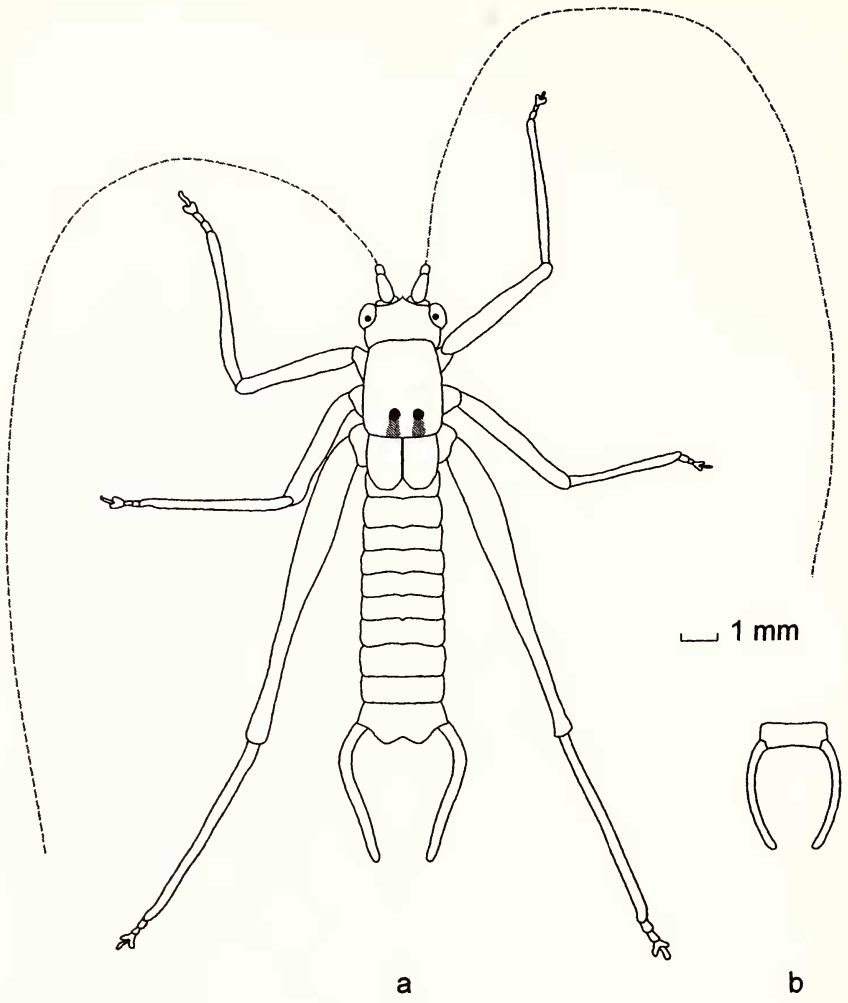

Fig. 1. Male from above. a. *M meridionale*. b. Cerci of *M. thalassinum*.

tree growing in a garden but overhanging the path known as Church Walk, near the station (TQ157670). It jumped rapidly from side to side and off the beating tray, narrowly escaping being squashed as a boy trundled past with a barrow. This active behaviour reminded me strongly of specimens seen in France and I took care to recapture it, finding that it was indeed a male *Meconema meridionale*.

I made further searches of the same general area on 28.ix and 16.x, both by day and by night, but, perhaps crucially, did not try beating the same birch tree again. A total of eight *M. thalassinum* were seen laying eggs on the trunks of various roadside trees, as were two speckled bush-crickets, *Leptophyes punctatissima* (Bosc), one on

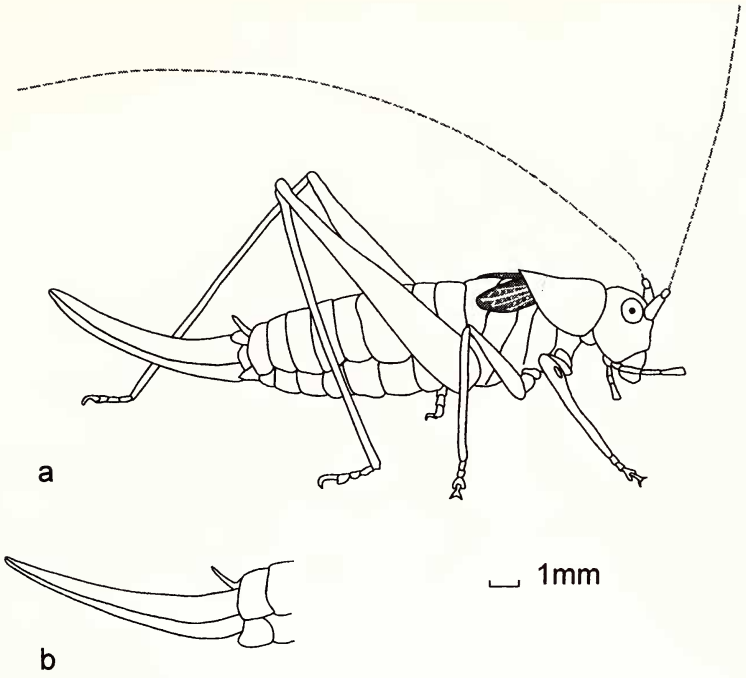

Fig. 2. Female in profile. a. *M. meridionale*. b. Ovipositor of *M. thalassinum*.

each evening. This latter species is just as common as *Meconema* but its oviposition behaviour is much more rarely observed.

In the absence of further specimens of *M. meridionale*, it seemed that the single male might have been a primary migrant to Britain or perhaps a wanderer from a colony elsewhere in southern England, rather than being bred locally in the private gardens of Church Walk which border on a cemetery and the grounds of a school. This speculation was rendered irrelevant by subsequent events.

Colonies found

While in captivity, the male from Thames Ditton was shown at a meeting of the Croydon Natural History and Scientific Society and at the Annual Exhibition of the Amateur Entomologists' Society. Several entomologists of my aquantance were honest enough to admit that they might previously have overlooked this species as a nymph of *M. thalassinum*. One of these was Derek Coleman, who proceeded to discover a thriving colony of *M. meridionale* in his own garden at Carshalton, in the London borough of Sutton but the vice-county of Surrey (TQ275639). He had recently moved into a single-storey building in the grounds of a large house, now divided into flats. The trees in the garden include four sycamores with contiguous crowns but well-separated trunks. A female *meridionale* was captured on one of these trunks on 18.x.2001, two more were seen on 19.x and, when I visited the site on 20.x,

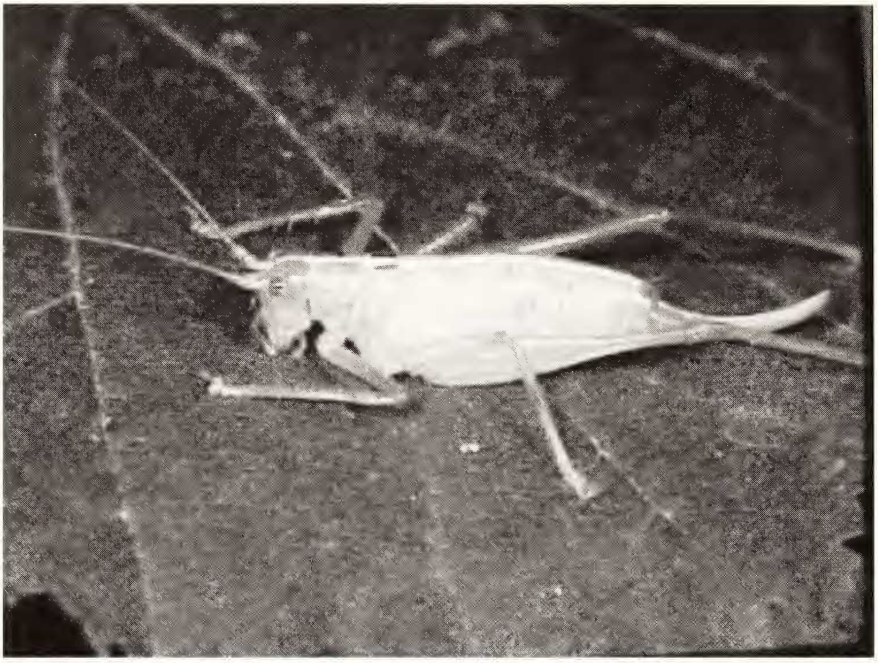

Fig. 3. Southern oak bush-cricket, *Meconema meridionale* Costa (Orthoptera: Tettigoniidae).

there were five females on the trees as well as two in captivity. Five of these seven females were observed laying eggs into cracks in the trunks. During the weeks that followed, further sightings were made at intervals during periods of mild weather, all on the same four sycamore trees. On two occasions a male was seen – one was captured on 6.xi and shown as a live specimen at the Annual Exhibition of the British Entomological and Natural History Society (Coleman, *in press*). There were still three females on the trunks on 17.xi and the colony persisted at least until 19.xi.2001.

On the same day that the colony in Carshalton was discovered, I showed photographs of *M. meridionale* and related species to my sister, Frances Kearsey. Within two days (20.x.2001) she found the new species in her own garden in Maidenhead, Berkshire (SU865794). A female *M. meridionale* was rescued from beneath her husband's paintbrush as he worked on the front of the house. The identification was confirmed by local entomologist Bernard Verdcourt who kindly arranged for the specimen to be delivered to me as a possible mate for my male. A further female was seen on 7.xi.2001 at the same spot, where a birch tree grows close to the wall of the house. We later learnt that my nephew Andrew Kearsey, who was away at university during October and November, had found a male bush-cricket on the house in mid-September and attempted to identify it using *The Oxford Book of Insects* (Burton, 1968). It did not match any of the species illustrated and was dismissed as an apparent nymph of *M. thalassinum*. In retrospect, this was probably

a male *meridionale*, and the three records from the site indicate the presence of a breeding colony.

Behaviour in captivity

The captive male was kept in a transparent plastic box of sufficient size for it to move around (14 cm × 9 cm × 6 cm), with a spray of leaves for it to walk on and hide behind. At first, no food was given beyond a small twist of wet tissue-paper for drinking, in the vain hope that it might find sufficient nourishment from small creatures on the leaves, although none of these were evident. After a week in captivity, I discovered it one evening eating small round holes in birch leaves. This was surprising since *Meconema* is generally held to be completely carnivorous. During the following morning the insect was very active when it would normally have been resting behind a leaf. I concluded that this aberrant behaviour was a mark of desperate hunger and resolved to offer it dead insects, of which I had a plentiful supply in the deep-freeze. The first was a green lacewing, *Chrysoperla carnea* (Stephens), which seemed a suitably juicy morsel. The bush-cricket found this within a few seconds and fed on it greedily, consuming the whole insect apart from some fragments of wings. After examining another dead lacewing, it then settled down under a leaf for the rest of the day. Further lacewings were provided at intervals, and then a succession of dead flies of the families Syrphidae, Tipulidae, Rhagionidae and even the bristly Tachinidae, all of which were nibbled to some extent. Later in its life, this male bush-cricket refused food and became very lethargic, eventually dying on 11.xi after eight weeks in captivity.

The species of *Meconema* do not rub their wings together to make an audible chirp, as do most other bush-crickets, but drum with their hind legs on the substrate, usually a leaf. This drumming was observed briefly on three occasions (2.x, 27.x and 28.x), both shortly after dusk and in the early morning. With one hind leg extended and the other drawn up beneath its body, the male insect curled its abdomen up in the air and then slammed it down onto the surface below, making an audible "tap - tap - tap - tap" when done on the floor, wall or lid of the plastic box. It could not be heard through the plastic when done on a leaf. Each tap may have been a double note and the tip of the abdomen may have struck the surface as well as the folded leg, but this was difficult to verify. On a later occasion the abdomen moved little and the insect clearly drummed with its leg, making a sequence of between three and seven taps (most frequently six) as it wandered about the box, interspersed with an occasional single tap. This drumming differs in pattern from that of *M. thalassinum* but agrees in general with previous observations of *M. meridionale* (Heller, 1988). As with other aspects of its behaviour, drumming ceased soon after the light in the room was turned on, with the insect retreating under a leaf to resume its daytime rest.

Shortly after the male from Thames Ditton was seen drumming, the female from Maidenhead arrived and was introduced to it but, perhaps surprisingly, nothing happened. Next day they were again put together and again with no effect, although the creatures were clearly aware of each other. Finally, they were left together overnight. Next day, at 7.30 a.m. on 1.xi, the female was found apparently laying eggs on one of several pieces of loose bark that I had provided. On my return home that evening at 6.30 p.m., the insects were mating. The posture was as illustrated by Tauscher (1986). The female sat on a leaf inclined at 20° to the horizontal, facing upwards, and was coupled to the male lying on his back facing away from the female but with his head raised to hold on to the tip of her ovipositor with his mandibles. Further observations were made at intervals, surreptitiously by torchlight. They were

still mating after 10 minutes but had separated after 50 minutes and both insects were eating the remains of the spermatophore, or sperm package that the male passes to the female during mating. The female remained inactive for the rest of that evening and the insects were placed in separate boxes. At dusk next day the female appeared to be laying eggs on a large piece of bark, but during the third day it died unexpectedly. It is difficult to explain how a well-fed insect should die suddenly so soon after a successful mating—perhaps from the first frost of the year on the previous night, or perhaps through loose pieces of bark being unsuitable objects for oviposition. No eggs were immediately obvious on the bark, but the pieces have been retained.

European distribution

Meconema meridionale was described from Italy by Costa in 1860. Over the next hundred years its distribution was ascertained to extend to neighbouring countries: south-eastern France, where it was rare, and the modern countries of Slovenia and Croatia. From 1960 onwards it was also found further north in ever-increasing numbers, firstly in south-west Germany and parts of Austria, then in north-central and eastern France, and finally in Holland, Belgium and some northern regions of Germany during the 1990s (Chopard, 1951; Bellmann & Luquet, 1995; Detzel, 1998, Kleukers *et al.*, 1997).

Many specimens have been found on and around houses, and others seen on cars. It is probable that this flightless species is being carried to new areas on motor vehicles—this has been observed directly in Germany on two occasions. The additional warmth generated by buildings seems to allow this insect to survive far to the north of its original distribution, but there are now records from country areas in the Rhine valley and other parts of southern Germany with a favoured climate (Detzel, 1998).

Comment

The occurrence of this species in neighbouring parts of the Continent, together with its probable spread using motor vehicles, made it highly likely that it would eventually be encountered in Britain. Now that it is here, it may well consolidate its population in the London area, where the extensive suburbs must provide a wealth of suitable habitat, and also spread to other parts of Britain, Maidenhead being already 40 km west of central London. There are likely to be many more colonies in other localities besides the gardens of entomologists and their relatives.

The wildlife of our gardens is often somewhat impoverished and this attractive species makes a welcome addition to this fauna. In the next few years it is important that all specimens of *Meconema* are checked carefully, particularly those found around houses and on motor cars. Publicising the species to non-entomologists may well allow further colonies to be located. Counting specimens at recently-established colonies should determine whether the species has a one-year or a two-year life-cycle. In the latter case, the eggs would pass through two winters before hatching, as occurs in some related species.

The male specimen from Thames Ditton has been placed in the collection of the British Entomological and Natural History Society at Dinton Pastures, together with females from Carshalton and Maidenhead.

Acknowledgements

I am grateful to Derek Coleman for allowing me to publish his observations, which show that the species is now present and breeding in Britain, and to John Widgery for supplying one of the European texts. For illustrating this paper I am deeply grateful to Graham Collins for the drawings and to David Clement for his photograph.

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SHORT COMMUNICATION

Some insects active during a period of continuous frost in East Sussex—On 27.xii.2000 the weather where I live at Sedlescombe in East Sussex (TQ782188) suddenly turned unusually cold as it did elsewhere in the British Isles. On the afternoon of 30 December, after three days of almost continuous frost, it remained very cold with snow lying on the ground and unmelted on bushes and trees. Although bright and sunny, the soil and the surfaces of our garden ponds were hard frozen and a light but penetrating wind blew from the north. In the shade the temperature remained below freezing and only a small amount of thawing had occurred in the shelter of south-facing hedges in direct sunlight and similar places.

In view of these unpropitious conditions I decided to see if there were any free-flying, or free-moving, adult insects about, or if frost had either killed them or driven them into sheltered nooks and crannies from which they could not easily be disturbed. I used a net that I take on summer surveys and swept around the garden, concentrating on evergreens like holly, box, juniper and ornamental firs where insects usually shelter.

The following day, 31 December, a second walk was taken round the garden at midday. The overnight frost had been just as hard as on the previous three nights, but the temperature had risen a few degrees above freezing by mid-morning and there was a much stronger wind from the south-east. It was a raw, cold winter's day. The many insects collected were much the same species as those of the previous afternoon, with one or two not found before and one or two absent (as one might expect with any survey of this kind).

Many of the species were very tiny and delicate which, perhaps, makes it even more surprising that they were able to survive in such apparently adverse conditions.